

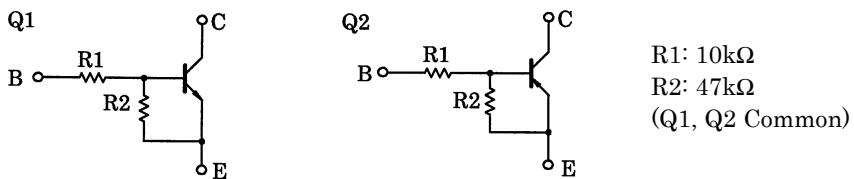
TOSHIBA Transistor
Silicon NPN Epitaxial Type (PCT Process) Silicon PNP Epitaxial Type (PCT Process)

RN4987

Switching, Inverter Circuit, Interface Circuit And Driver Circuit Applications

- Including two devices in US6 (Ultra super mini type with 6 leads)
- With built-in bias resistors
- Simplify circuit design
- Reduce a quantity of parts and manufacturing process

Equivalent Circuit and Bias Resister Values



Q1 Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	50	V
Collector-emitter voltage	V_{CEO}	50	V
Emitter-base voltage	V_{EBO}	6	V
Collector current	I_C	100	mA

The drawing consists of two parts: a top view and a side view of the US6 package. The top view shows a rectangular package with six pins labeled 1 through 6. Dimensions include a total width of 2.1 ± 0.1 mm, a height of 2.0 ± 0.2 mm, and a central vertical slot of 1.25 ± 0.1 mm. The side view shows the thickness of the package body as 0.9 ± 0.1 mm and the height of the pins as 0.15 ± 0.05 mm. The pins are labeled as follows: Pin 1 is Emitter 1 (E1), Pin 2 is Base 1 (B1), Pin 3 is Collector 2 (C2), Pin 4 is Emitter 2 (E2), Pin 5 is Base 2 (B2), and Pin 6 is Collector 1 (C1).

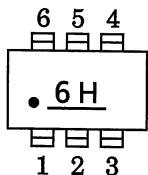
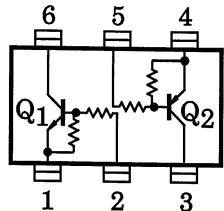
Q2 Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector-base voltage	V_{CBO}	-50	V
Collector-emitter voltage	V_{CEO}	-50	V
Emitter-base voltage	V_{EBO}	-6	V
Collector current	I_C	-100	mA

Q1, Q2 Common Maximum Ratings (Ta = 25°C)

Characteristic	Symbol	Rating	Unit
Collector power dissipation	P _C *	200	mW
Junction temperature	T _j	150	°C
Storage temperature range	T _{stg}	-55~150	°C

* : Total rating

Marking**Equivalent Circuit (Top View)**

Q1 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	—	$V_{CB} = 50V, I_E = 0$	—	—	100	nA
	I_{CEO}	—	$V_{CE} = 50V, I_B = 0$	—	—	500	
Emitter cut-off current	I_{EBO}	—	$V_{EB} = 6V, I_C = 0$	0.081	—	0.15	mA
DC current gain	h_{FE}	—	$V_{CE} = 5V, I_C = 10mA$	80	—	—	—
Collector-emitter saturation voltage	$V_{CE}(\text{sat})$	—	$I_C = 5mA, I_B = 0.25mA$	—	0.1	0.3	V
Input voltage (ON)	$V_I(\text{ON})$	—	$V_{CE} = 0.2V, I_C = 5mA$	0.7	—	1.8	V
Input voltage (OFF)	$V_I(\text{OFF})$	—	$V_{CE} = 5V, I_C = 0.1mA$	0.5	—	1.0	V
Transition frequency	f_T	—	$V_{CE} = 10V, I_C = 5mA$	—	250	—	MHz
Collector output capacitance	C_{ob}	—	$V_{CB} = 10V, I_E = 0, f = 1 MHz$	—	3	6	pF

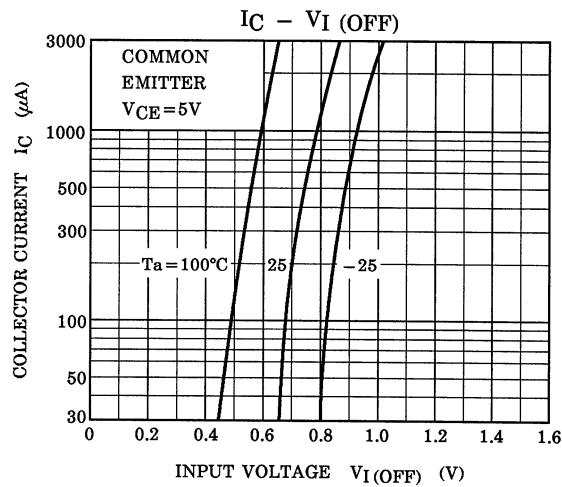
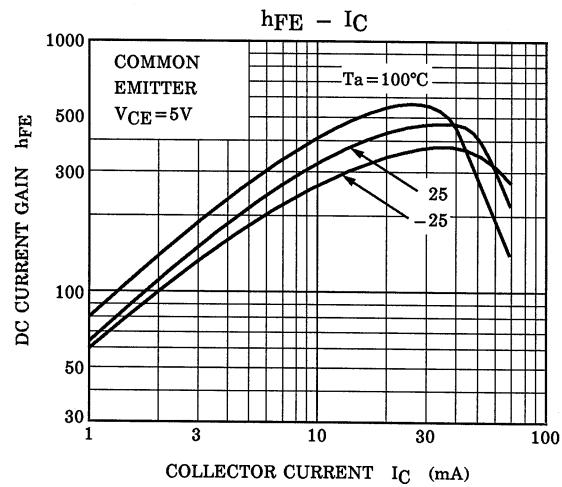
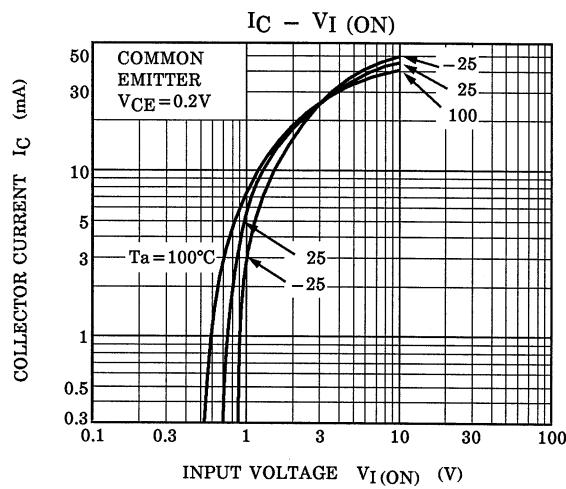
Q2 Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Collector cut-off current	I_{CBO}	—	$V_{CB} = -50V, I_E = 0$	—	—	-100	nA
	I_{CEO}	—	$V_{CE} = -50V, I_B = 0$	—	—	-500	
Emitter cut-off current	I_{EBO}	—	$V_{EB} = -6V, I_C = 0$	-0.081	—	-0.15	mA
DC current gain	h_{FE}	—	$V_{CE} = -5V, I_C = -10mA$	80	—	—	—
Collector-emitter saturation voltage	$V_{CE}(\text{sat})$	—	$I_C = -5mA, I_B = -0.25mA$	—	-0.1	-0.3	V
Input voltage (ON)	$V_I(\text{ON})$	—	$V_{CE} = -0.2V, I_C = -5mA$	-0.7	—	-1.8	V
Input voltage (OFF)	$V_I(\text{OFF})$	—	$V_{CE} = -5V, I_C = -0.1mA$	-0.5	—	-1.0	V
Transition frequency	f_T	—	$V_{CE} = -10V, I_C = -5mA$	—	200	—	MHz
Collector output capacitance	C_{ob}	—	$V_{CB} = -10V, I_E = 0$	—	3	6	pF

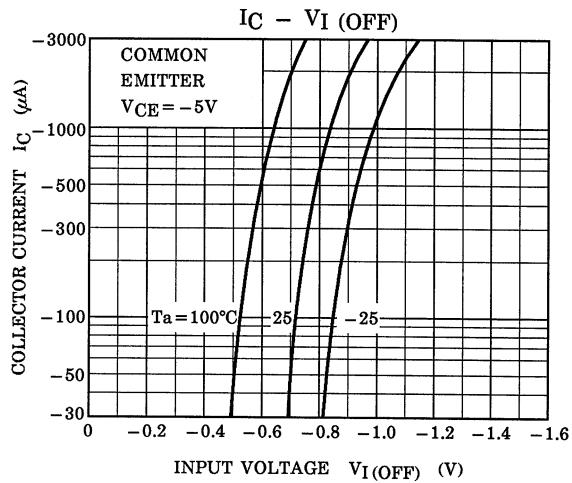
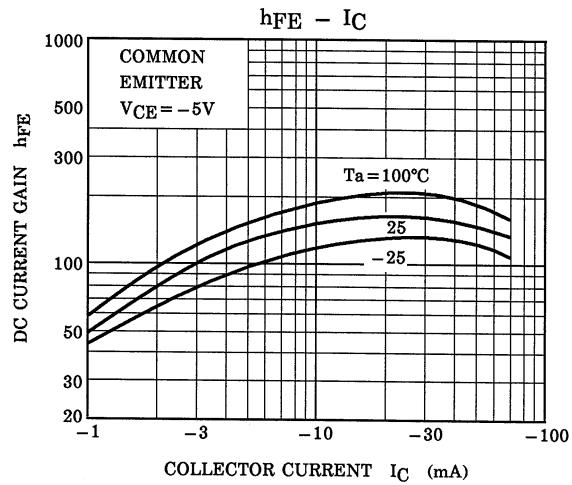
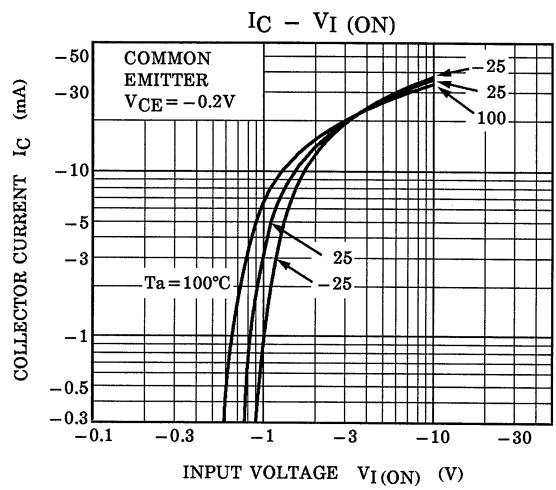
Q1, Q2 Common Electrical Characteristics (Ta = 25°C)

Characteristic	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input resistor	R_1	—	—	7	10	13	kΩ
Resistor ratio	R_1/R_2	—	—	0.191	0.213	0.232	—

Q1



Q2



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